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V. Part of a Letter to Dr. Clopton Havers, S. R. S. giving an Account of an extraordinary Hæmorrhagia at the Glandula Lachrymalis.

S I R,

SInce my coming to this place I have met with a very strange Case. An Icteric disconsented Woman having a desire to dye, wholly rejected the help of Medicine, and within three Months being well nigh her end, there happened an Eruption of Blood out of the *Glandula Lachrymalis* of one of her Eyes, without any External Injury : There was an Evacuation of ~~thij.~~ of Blood within the space of Thirty Hours. About a Week after the same Sluce was opened again, and she bled till she dyed. Now, I would fain know what Blood-Vessels come to that Gland, from which such a vast quantity of Blood should be cast forth in so short a time.

VI. A Letter from Richard Townley, of Townley in Lancashire, Esq; containing Observations on the Quantity of Rain falling Monthly, for several Years successively: Communicated to the Royal Society.

Townley, Jan. 9. 1693.

S I R,

IHave now compleated this last Year's Observations, which I was very desirous should accompany the others I now also send you; and I hope you will be pleased

pleased upon that score to Pardon my delay in obeying your Commands: I wish they had been more exactly made, and should have been so, had they been intended for any thing but my own Satisfaction, and enabling me to give some conjecture at the Proportion of Rain that falls in this County, with that at *London*, and in other Parts of this Kingdom. But in this I have not yet attained my desired end, not having heard of the like made in any Part of *England*; though a Friend or two had promised to undertake and afford me an Account of their Observations; but it may be they did not think it worth their while, or that it would prove more troublesome than I have found it: For I only fixed a round Tunnel of 12 Inches Diameter to a leaden Pipe, which could admit of no Water, but what came through the Tunnel, by reason of a part solder'd to the Tunnel it self, which went over the Pipe, and served also to fix it to it, as well as to keep out any wet that in Stormy Weather might beat against the under part of the Tunnel, which was so placed, that there was no building near it that would give occasion to suspect that it did not receive its due proportion of Rain that fell through the Pipe some Nine Yards Perpendicularly, and then was bent into a Window near my Chamber, under which convenient Vessels were placed to receive what fell into the Tunnel; which I measured by a Cylindrical Glass at a certain mark, containing just a Pound, or 12 Ounces *Troy*, and had marks for smaller parts also. I prefer'd this way of finding the Content of my Vessel for measuring the Water before any other, of Gaging of small Cubical or Cylindrical ones; where an inconsiderable and almost indiscernible Error in the Dimensions will prove much greater in the Content; whereas in the other way, provided the Cylinder it self be small, or have a very small Neck at the marked place for a Pound, one may easily come to as great exactness as may be wished.

wished. By the help of this Cylindrical Glass I thus kept my Account of what Rain fell, and generally twice or thrice a day; when I took several other Observations, both of the Thermometer, Barometer, Winds, &c. what Rain I found in the Receivers, if not more than made what was left in the Cylindrical Glass a full pound, I again left in it; but if there was more than that quantity, I filled it just to the Pound mark, which I threw away, and did the like with the remaining Water, as often as it would allow, still keeping an Account chiefly of the Pounds thrown away, and noting also the parts of a Pound remaining in the Glass; by the help of which latter, and the parts remaining at any time before, by numbring the Pounds, and substracting the Parts at the end, for Example, of one Month, from the Pounds thrown away, and the Parts remaining at the end of another, I find the quantity of Rain fallen betwixt these two times, and that so as to assure me that I erred no more in the quantity of Rain of another Year, than by the mistake in the differences of the parts of a Pound in the first and last Observation: Whereas should I still write down the Rain that falls between two Observations, I might be subject to make as great a mistake in every one of them, and consequently be much more uncertain of the quantity of Rain fallen in many of those added together: Besides this Addition is longer in performing, and giving the quantity sought, than the Method I make use of. I have added these Particulars to shew you how little trouble there is in this Task; which therefore I hope some of your Ingenious Friends may be perswaded to undertake, and then by continuing my own Observations, I may be further satisfied, than hitherto I have been with them: For all I have yet learnt as to the main Point, is, that here we have almost just twice the quantity of Rain that falls at *Paris*. This County, and particularly that part of it

where I live, being generally esteemed to have much more Rain than other Parts, and in a greater proportion than I thought reasonable to be allowed ; however it be, yet by what I have sent you, 'twould be unjust, without further Observations of the like Nature in other Parts, that all *England* should be esteemed to abound as much in Rain as these Parts do : Where by reason of the very high Grounds in *Yorkshire*, and the Eastern Parts of *Lancashire*, the Clouds driven hither by the S. and S. W. the general Winds in this Part of the World, are oftner stopt and broken and fall upon us, than such as come by an E. or S. E. Wind, which broken by the Hills, are generally spent there, and then little affect us ; and this is the reason that *Lancashire* has often considerably more Rain than *Yorkshire*.

The above-mentioned Method of Estimating Rain by Pounds, to those of my Family, gave a sufficient Idea of the Proportions of the falling Rains, and the wetness of the different Seasons, though they knew not how high it would raise the Water in a Cylinder equal, at the bottom, to my Tunnel ; but to inform others of this with little trouble, in the Table I have sent you, the Pounds and Parts are doubled, and these I have rather sent you, than those of the whole Pounds ; since the same gives both the quantity of half Pounds, and the height in Inches, according to the general way of Estimating the quantity of Rain, only with this difference ; that for the half Pounds only the last Figure is a Decimal Fraction, and the other the number of the half Pounds ; and for the Height the two last Figures denote the Decimal Fraction of an Inch, and the remainder the height in Inches, so near the truth, that they only fall short of it one Inch in 200, which defect is easily supplyed. To this I need only add, that the Numbers on the right hand are the Sums of all those in the same Line, that is in the first part of several Numbers for Ten Years ; so that the

last

last of them shews the Sum both of the half Ounces that have fallen during that space of time, and the height the Water would have been raised in that time also. To this I shall only add one Example: The Sum of all the Rain in the Ten first Years 41227, and therefore according to what hath been said, 41227 is the number of half Pounds that fell in compass of the Tunnel during those Ten Years; and 41227 the height it would have raised the Water during that time. But if you desire to be more critical, if you add 206 its 200th. part, you will have 41433 for the true height, and 41413 for the mean height by those Ten Years Observations; and 41227 for the mean quantity of half Pounds. By the same Method you will have the means for the other Five, *viz.* of height 4178, and 4178 for the mean number of half Pounds, which means do strangely agree, and both considered do give for the mean by all the Fifteen Years 41516 Inches in height, which is about $\frac{1}{4}$ of an Inch more than double to that raised by the Water at *Paris*, which as set down in the *Memoirs for the Ingenious*, for *February* last, is stated about 19 $\frac{1}{2}$ *French* Inches, which make 21 *English*. I have omitted the Account of the Years 87 and 88, which I found faulty, by reason the Person (who had the charge of noting what Rain fell during my absence several times then from home) did not punctually observe the usual Method I had prescribed him. I forgot when I mentioned my way of Gauging by Weight, that it was grounded upon 227368 Cubical Inches of Rain-water, being equal in weight to one Pound, or 12 Ounces *Troy*; so that dividing any Superficies in Inches of a Vessel for receiving the Rain-water by the before mentioned Number, it will give you the Pounds and Parts that will raise the Water upon that Superficies, with upright sides, just an Inch: And thus I found that 4974 Pounds would fill a Cylinder equal at the bottom to my

Tunnel, and one Inch high, which you see is very near five Pound, which you will also find will only raise the Cylinder higher by $\frac{1}{10}$ th. part. But now I have detain'd you so long, and I am afraid needlesly ; so that I trust to your Goodness for Pardon in this, and what else you shall here find amiss upon the score of my Eyes, which oblige me to trust more to others, than otherwise I should. I am

Your most Humble Servant,

Rich. Townley.

P. S. In a late Posthumous Book of Mr. *Boyle's*, I find an Account of some of my Observations of the Barometer, without any hint of the Use intended to be made of them, which make them seem to be very oddly brought in : All that I can remember, is, that he was pleased to lay his Commands upon me, to send him an Account of the several times that I had found the *Mercury* above or near 30 Inches high, or not much above 29 during the time he mentioned : But I know not whether I did hint to him, or indeed did then really know my self the great Harmony betwixt the *Mercurial* Standards at *London* and here at *Townley* : For by a whole Month's Observations, Mr. *Flamstead* was pleased to send me, the *Mercury* still rose and fell both there and here exactly at the same time ; I always found it rather more than $\frac{1}{10}$ of an Inch lower here than at *London*, by reason that we are seated though in a seeming Valley, in respect of the Neighbouring Grounds, yet we are considerably higher than the other low Lands near the Sea, where the Standard differs little from that at *London*. I should be very glad to know whether the like Agreement has been observed in *France*, or other remoter Parts, betwixt their

their height of the *Mercury* and that at *London* : You would also Oblige me in procuring me some Observations of the Barometer, made this last Year at *London*, where there was so much Rain for the most part of the Summer, and here so little; as you will find by the Paper I have sent you, and so great a Drought, that we have not above half the Proportion of Hay that less dry Summers used to afford us; for if sometimes the different heights of the *Mercurial* Standards vary much probably 'twas about that time; though I am inclined they do not alter, except it be in very hot and cold Weather, when the weight of the same Cylinder of Air may much vary in its weight, as well as rarity and density : But in confirmation of what I have said above, I suppose you may not be displeased with two Remarkable Observations, made both by Mr. *Flamsteed* and me at the same time, *viz.* *Novemb.* 18th. 1674. when finding the *Mercury* to descend both very fast and very low, we watch'd it very nicely, and both of us observed that at Two in the Afternoon it was rather falling, and rather rising at Four; at which times the height was only here 27[63] Inches, and at *London* $\frac{1}{2}$ ths higher.

The TABLE of Rain.

	1677	78	79	80	81	82	83	84	85	86	Sum
Jan.	472	371	043	512	053	946	237	032	110	472	3289
Febr.	270	371	161	492	303	135	243	483	042	020	2582
March	245	250	202	413	235	237	303	087	180	572	2731
April	325	170	092	222	057	308	402	370	304	305	2631
May	313	581	105	188	069	315	354	097	203	437	2659
June	516	257	298	342	397	517	463	192	410	473	3870
July	351	339	350	302	292	482	412	313	497	188	3526
Aug.	485	145	835	502	425	385	581	338	392	870	4965
Sept.	223	527	553	146	607	293	152	199	161	572	3435
Ottob.	333	644	616	570	170	427	331	425	325	293	4133
Nov.	432	555	127	479	235	525	192	579	521	791	4355
Dec.	400	057	439	269	423	456	032	299	548	132	3051
Sum	4365	4267	3821	4428	3326	5066	3716	3414	3701	543	41227

	1687	88	89	90	91	92	93	Sum
Jan.		333	707	197	654	218		1509
Febr.		393	171	112	168	678		922
March		875	145	476	342	298		2136
April		468	673	386	498	539		1969
May		182	244	300	339	693		1149
June		302	179	412	416	181		1490
July		120	218	285	448	112		1183
Aug.		222	402	193	198	668		1683
Sept.		442	403	2151	677	641		2306
Oktob.		740	765	165	273	514		2457
Nov.		415	717	2301	140	627		2137
Dec.		36	262	1691	892	261		1952
Sum		4860	4291	314	4372	4230		20893

An Account of an Accurate Experiment of the Quantity of Vapour compared with this of the Rain, with several Observations thereon, is intended to be part of one of the next Transactions.

VII. Historia Lumbaginis Rheumaticæ Convulsivæ, à Roberto Pitt, M. D. & S. R. S. Communicata.

VI R erat quasi 35 Annorum, robustus Temperamenti Bilioſi, qui Decimis colligendis eo tempore occupatus, post Operam laboriosorem peros forſan cito nimis ex rigore admisso occluſerat.

Primà ergo Morbi Invasione febricitavit, primo, rigore & Horrore, dein Calore, & Doloribus vagis, (nunc in Ventriculo & Intestinis, mox in Pectore ſævientibus) corruptus: Venum hæc Symptoma cum aliis brevi permuntantur. Materia enim Morbum committens ſe in Dorſo omnem depositit; hinc immanis Lumborum Dolor ad Coxendicem